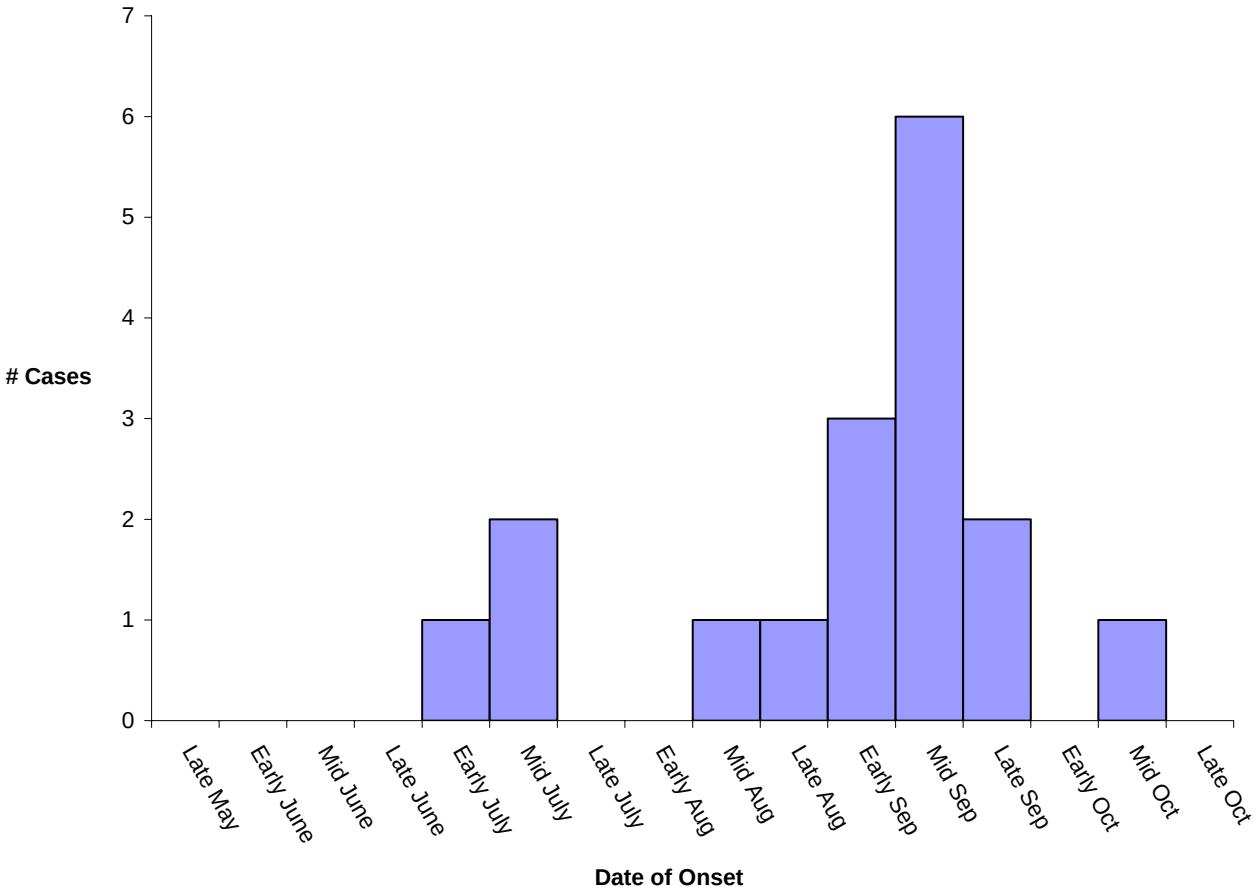
# West Nile Virus and Other Arboviral Surveillance in Wisconsin
## 2005 Final Report

## Introduction
A West Nile virus (WNV) surveillance program has been in place in Wisconsin since 2001. This surveillance program involves the effort and cooperation of numerous partners, including local, state, and federal agencies. The program has been supported by a federal Expanded Laboratory Capacity (ELC) cooperative agreement from the U.S. Centers for Disease Control and Prevention (CDC).

## Human Case Surveillance
During 2005, human case surveillance was conducted statewide for WNV and other arboviruses, including La Crosse virus (LAC), eastern equine encephalitis virus (EEE), and St. Louis encephalitis virus (SLE). For WNV, commercial laboratories and the Wisconsin State Laboratory of Hygiene (WSLH) conducted screening tests of serum and cerebral spinal fluid (CSF) specimens to detect the presence of WNV IgM antibody, an indicator of acute WNV infection. Fee-exempt testing at the WSLH was subsequently performed on WNV-positive specimens using a WNV IgM antibody capturing assay (MAC-ELISA). In addition, the American Red Cross screened donated blood units for presence of WNV markers. Testing for other arboviruses was performed at commercial laboratories and WSLH, and positive specimens were sent to CDC for confirmation.

*Reported WNV infections in humans*
A total of 17 cases of WNV illness were reported among Wisconsin residents during 2005. Illness onsets for WNV case patients occurred from mid-July to mid-October most occurred between mid-August and late September [Figure 1].

Figure 1 Cases of human West Nile virus illness by date of onset – Wisconsin, 2005

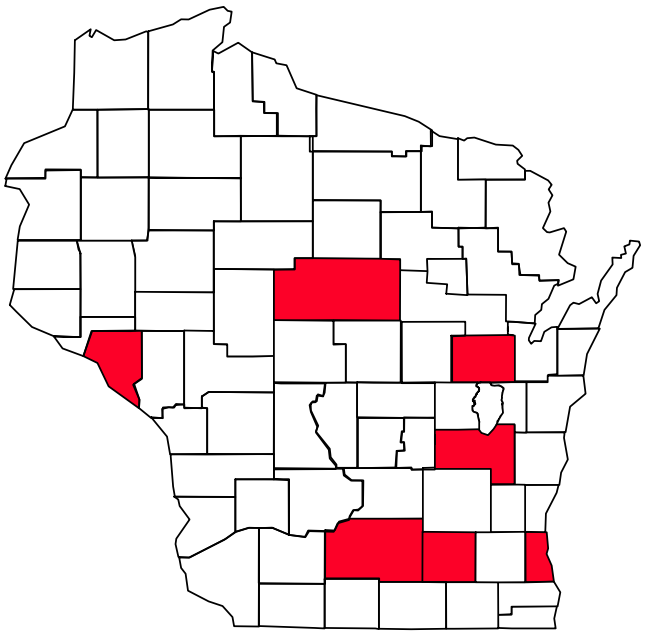


Three (18%) cases occurred in blood donors whose viremic infections were detected when their donated blood units were tested (in addition, 1 asymptomatic blood donor was identified with WNV infection). Eleven (65%) cases involved neuroinvasive illness (9 with documented encephalitis); 10 of these 11 neuroinvasive disease (NID) case patients were hospitalized and 2 died from complications due to their WNV illness. The incidence rate for WNV NID among Wisconsin residents during 2005 was 2.0 cases per million persons. The 6 case patients without NID had uncomplicated WNV illness. One case patient likely acquired WNV infection outside of Wisconsin.

Nine (53%) of the 17 cases were reported in males, case patient ages ranged from 18 to 88 years (median = 55 years). Four case patients with NID were less than 50 years of age (range: 38—48 years).

The 17 cases occurred in residents of seven different counties: Milwaukee (8), Dane (3), Jefferson (2), Fond du Lac (1), Outagamie (1), Buffalo (1), and Marathon (1) [Figure 2].

Figure 2 County of residence of reported human West Nile virus case patients – Wisconsin, 2005



The 8 case patients from Milwaukee County were residents of five different health department jurisdictions: Milwaukee City (4), North Shore (1), Wauwatosa (1), West Allis (1), and Franklin (1). Although these 8 cases represented 47% of the Wisconsin human case total for 2005, no human WNV cases were reported from Milwaukee County during 2003 or 2004.

Prior annual human case totals reported in Wisconsin residents include 12 in 2004, 17 in 2003, and 52 in 2002, the first year human WNV illnesses were reported in the state.

Nationally, as of January 10, 2006, 2,819 human cases of West Nile illness were reported with illness onset in 2005; 1,189 (42%) involved neuroinvasive disease and 105 deaths from West Nile illness (3.7% case-fatality ratio) were fatal.

*Other arbovirus infections in humans*

Three confirmed human cases and 1 probable human case of symptomatic LAC virus infection occurred among Wisconsin residents during 2005. This case total is lower than in previous years; Wisconsin had 7 reported human LAC cases in 2004 and 15 cases in 2003. In addition, 5 illnesses due to dengue virus infection occurred among Wisconsin residents; all were the result of imported infections acquired during travel to Central or South America. There were no human cases of SLE or EEE virus infections reported in Wisconsin residents during 2005.

## Corvid Surveillance

Statewide monitoring of sick or dead corvid species (crows, ravens, and blue jays) continued from May through October of 2005. A West Nile virus information hotline (WNV hotline) and specimen submission system was operated by USDA Wildlife Services to assist with this monitoring.

A total of 1,449 reports from WNV hotline, local health departments and other cooperating partners were reported on the Health Alert Network (HAN) during the monitoring period. The number of calls to the WNV Hotline was down 30% from 1,661 in 2004. Fifty-six percent of these calls were reports of dead or sick corvids; other calls to the hotline pertained to non-corvid species or general information regarding WNV. Calls to the WNV hotline varied by county, with less than seven calls from each of 41 counties and with 35% of all calls originating from Dane County. In addition, the heavily human populated counties of Dane, Milwaukee and Waukesha reported 370, 320, and 118 ill or dead corvids respectively, which comprised 56% of the total corvid-related reports to HAN.

Of the 195 corvids collected, USDA Wildlife Services extracted and submitted skin tissue from 163 corvid species. Testing for presence of WNV was performed between May and October at the University of Wisconsin Veterinary Diagnostic Laboratory (WVDL). Results from the testing were updated weekly on the HAN. Once two birds from a county were positive for WNV, testing was discontinued for corvids in that county since two positives was deemed sufficient evidence for circulating virus among the bird population in that county.

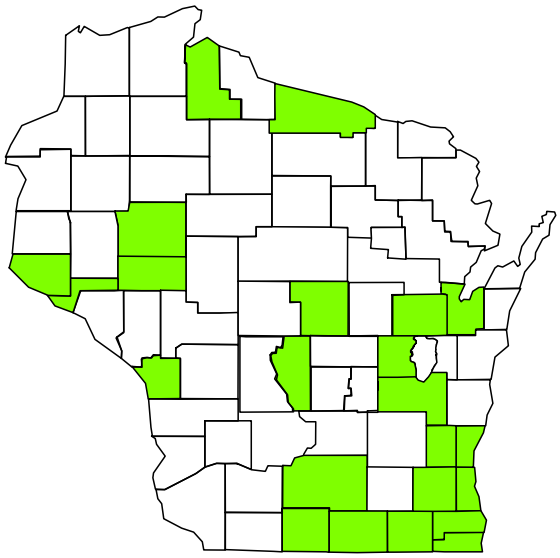
Forty-seven (29%) of the 163 were positive for WNV [Table], down from the 118 (30%) positive of 240 birds tested during the 2004 season.

Table Corvid species by age and test results

| | American Crow | | Blue Jay | | Raven | | Totals |
|---|---|---|---|---|---|---|---|
| | **Adult** | **Fledge** | **Adult** | **Fledge** | **Adult** | **Fledge** | |
| **Positive** | 34 | 4 | 9 | 0 | 0 | 0 | 47 |
| **Negative** | 40 | 39 | 26 | 9 | 2 | 0 | 116 |
| **Subtotal** | 74 | 43 | 35 | 9 | 2 | 0 | 163 |
| **Total** | 117 | | 44 | | 2 | | |

WNV-positive corvids were collected in 23 different counties [Figure 3] from late May to late September, with most collected between late July and late August.

Figure 3 Counties with birds testing positive for West Nile virus – Wisconsin, 2005



Since 2003, WNV-positive birds have been collected from 60 (83%) Wisconsin counties, evidence of a widespread endemicity of WNV among bird populations in the state.

## Equine Testing

West Nile virus testing was available for veterinarians treating horses with neurological symptoms. Specimens were submitted and tested at the WVDL. Fifteen horses were positive for WNV (down from 19 in 2004 and 47 in 2003) and five died. WNV-positive horses were from 11 different counties: Barron, Chippewa, Clark (2), Crawford (2), Eau Claire, Jefferson, Marathon, Pepin, Rock (2), Trempealeau, Walworth, and Waushara. No positive horses had received WNV vaccine in 2005 and only one had received WNV vaccine in 2004, evidence that the substantial decrease in WNV-positive horses since 2003 may partly be due to vaccination and the effectiveness of the equine vaccine.

During 2005, the WVDL also conducted equine testing for EEE upon request; no horses tested positive for EEE.

## Mosquito Testing

Ten Wisconsin communities (Appleton, Brown Co., Eau Claire, Franklin, Kenosha Co., City of Milwaukee, Madison, Racine Co., Waukesha Co., and West Allis) conducted mosquito collection and testing of *Culex* mosquitoes from May to October as part of a mosquito pool surveillance program targeted toward urban areas of Wisconsin. The Marshfield Clinic Medical Research Foundation performed pooling and testing of *Culex* mosquito traps placed in the 10 participating communities. Possibly due to dry conditions during late spring and early summer, overall numbers of mosquitoes appeared to be less than in previous years; however, *Culex* numbers appeared to be higher than previous years. Of the 604 *Culex* pools collected and tested, 22 (3.6%) were positive for WNV. Sixteen of the 22 were from the City of Milwaukee (nine different trap sites), 2 from Madison, and 1 each from Appleton, Brown County, Eau Claire, and Kenosha Co. The City of Milwaukee had the most *Culex* pools tested (309), followed by Appleton (180), Brown Co. (40), and Franklin (27). *Culex* pools testing positive were collected from late July to mid-September.

## Other Species Testing

Testing of specimens collected from 128 selected non-corvid and animal species is being performed by the cooperative efforts of the Wisconsin Department of Natural Resources and the University of Wisconsin-Madison. Testing results for these specimens are pending.

## WNV Working Group

The West Nile Virus Working Group, a multidisciplinary body dealing with WNV surveillance issues in Wisconsin, was convened in August 2001 and met twice during 2005 (March and December) and discussed WNV surveillance-related activities for the 2005 season. This group is scheduled to meet again in March, 2006, primarily to discuss issues related to the 2006 WNV season. Potential topics of discussion at the March 2006 meeting include enhancing protection education efforts (including public service announcements) later in the WNV season to coincide with the traditional peak in human cases in Wisconsin and in groups that are currently not aggressively targeted, aggregation and interpretation of existing animal testing data, and issues regarding mosquito testing and abatement.

## Public Outreach

Press releases pertaining to WNV disease and means of protection were distributed prior to and during the spring and summer 2005 at both the state and local levels. “Fight the Bite – West Nile Virus in Wisconsin” and other brochures describing means of protection against WNV and other arboviruses were available and remain for distribution to the public and to public health professionals.

These brochures were distributed at both state and local levels. In addition, the Wisconsin Division of Public Health (DPH) maintained a WNV website http://dhfs.wisconsin.gov/communicable/westNilevirus/ with real-time statewide human, corvid, equine, and mosquito testing and surveillance data, information on personal protection against WNV exposure, and a link to the CDC WNV website http://www.cdc.gov/ncidod/dvbid/westnile/index.htm.

## Contact Information

This report represents work conducted as statewide during 2005 by numerous individuals from various agencies and organizations. Any questions or comments regarding this report or West Nile surveillance activities within Wisconsin may be directed to Mark Sotir PhD, MPH, at: (608) 267-9000 or sotirmj@dhfs.state.wi.us.